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A NEW ARIZONA *HYDRIOMENA**

BY J. McDUNNOUGH,
Ottawa, Ont.

Hydriomena gracillima n. sp.

Palpi moderately long, porrect with third joint slightly downcurved, pale creamy, clothed with closely appressed scales. Antennae thin, dark. Head and collar pale creamy with a black spot on collar behind each eye. Thorax whitish with a slight greenish tinge, the patagia heavily shaded with black at base. Abdomen light creamy-ochreous. Primaries with light greenish ground-color, sprinkled slightly with white in the basal and terminal areas and heavily shaded with this color in the postmedian band. The lines and bands crossing the wing are of a deep purple-brown color, at times almost black. There is a short, irregular, basal half-line ending at vein 1. The usual subbasal line is moderately thick, enlarged slightly at costa and inner margin and tending to obsolescence in the cell; it runs perpendicular to costa as far as cubitus, then is bluntly angled and proceeds perpendicular to inner margin with a slight outcurve just before same. A broad, purple-brown, slightly outwardly oblique band occupies the median area; its inner edge, formed by a blackish line, is almost rigidly oblique with an outward projection in cell and forms the outer margin of the greenish basal area; on the costa it is broken up into a large, quadrate, inner patch and a narrower elongate outer patch, the two separated by a quadrate patch of the green ground-color; the deep black-brown outer margin of the band is irregularly upright, with a slight indent in the cell and short outer angles at veins 1 and 2; originating from the outer side of the inner, costal patch an obscure, dark, waved line cuts through the median area of the band. The postmedian area, following this dark, median band, forms a rather narrow band of green color, variably and, at times, heavily sprinkled and shaded with white and considerably broader at costa than at inner margin; in the costal area the irregular outer margin of this band is formed by a thick line or band of deep purple-brown which descends, irregularly upright, to vein 4 where it abruptly angles outward at almost right-angles; beyond this the border is obsolescent, being merely indicated by scattered blackish marks which indicate a considerable narrowing of the band as it approaches the inner margin. Subterminal area of the green ground color, especially at costa, but considerably suffused with purple-brown, especially opposite cell and tending to merge with the median band in the inner area of wing, due to lack of defining lines. The usual, broad, purple-brown, irregular band separates the greenish submedian and terminal areas; the margins of this band are black-brown and the outer one is strongly dentate; the band forms a quadrate costal patch then narrows abruptly to almost a line and is angled outward at vein 8, narrows again to a line (or may even be broken) above vein 3 and almost touches outer margin above vein 2. A small black-brown spot on outer margin below apex, more or less conjoined to the subterminal band, followed along outer margin by a series of small dark spots, partially connected, marking the terminations of the veins. Fringes palish, checkered with smoky opposite veins. Secondaries characteristically of a light ochreous flesh-color, somewhat smoky in basal area and crossed by two, smoky, closely approached, wavy, postmedian lines which do not attain costa. Outer

*Contribution No. 2304, Division of Entomology, Science Service, Department of Agriculture, Ottawa.

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margin narrowly shaded with smoky especially towards anal angle. Fringes concolorous, finely cut by dark streaks. Expanse 30-33 mm.

Holotype — ♂, Barfoot Park, Chiricahua Mts., Ariz., May 23, 1934 (G. and J. Sperry); No. 5511 in the Canadian National Collection, Ottawa.

Paratypes — 2 ♂, same data, one in Collection Sperry, the other in Collection Los Angeles Museum.

This species, which shows considerable resemblance to *speciosata* and *morosata* in general type of maculation, should be readily recognized by the peculiar coloration of the secondaries. The male genitalia show a relationship to the *furcata-quinquefasciata* group. The uncus has a long, narrow neck which broadens out to a spatulate apex with evenly rounded margin; the chitinous costa of the clasper projects apically beyond the membranous portion in a short sharp spine as is usual in the group; the aedeagus is long and thin, the vesica showing a small bunch of very fine cornuti.

SOME PLECOPTERA FROM THE FAR NORTH*

BY W. E. RICKER,

Indiana University, Bloomington, Ind.

Through the kindness of Drs. J. McDunnough and O. Peck of the Division of Entomology, Ottawa, the writer recently had the opportunity of examining the Plecoptera of the Canadian National Collection which were taken in the more northern parts of Canada, Alaska and Labrador. An additional number have been examined from the United States National Museum, by courtesy of Dr. E. A. Chapin. The new records to be presented from these sources are a welcome addition to our knowledge of the stonefly fauna of the northern regions, and the specimens exhibit new extremes in the range of variation of some of the species. In order to summarize our knowledge of the arctic fauna, previous records will be cited briefly.

In terms of vegetation regions, the area to be considered consists of the treeless tundra, and most of the boreal forest, being thus much wider than the arctic zone as defined astronomically. The political divisions included are: the arctic islands, which, with two peninsulas of the mainland, constitute the administrative District of Franklin; Alaska (except the mild southern coastal region); the Yukon; the Districts of Mackenzie and Keewatin (comprising most of what was formerly called the Northwest Territories); the northern third, approximately, of the provinces of Alberta and Saskatchewan; the northeastern half of Manitoba; Ontario north of the most northern transcontinental railway line; Quebec north of a line from Lake Abitibi region to the Gulf of St. Lawrence near Anticosti Island; and the Newfoundland Labrador. The general southeastward trend of this line of demarkation corresponds roughly to a similar dip of the isotherms across the continent. The region thus set off has relatively few settlements of any size; consequently collections have been made only at scattered points.

It is interesting that much the best collection from any single locality in this region is also one of the earliest. It was made at St. Martin's Falls on the Albany River, Ontario, in the 1830's and early 1840's, by the naturalist George Barnston, a factor of the Hudson's Bay Company, and is now in the British Museum. Barnston prepared an account of his collections, gave the species new names, and described their habits. This he apparently never published, but six of his names were adopted and credited as "Barnston MSS" in publications by

*Contribution number 317 from the Department of Zoology, Indiana University Bloomington, Indiana.

Newport and Walker, and the type specimens in the British Museum still carry labels in his hand. A good case might be made out for the view that Barnston should be considered the author of these species, but it is perhaps not quite clear from Newport's papers whether the descriptions of the insects (as distinct from their habits) were taken from Barnston's manuscript, though it seems very probable.

Three English entomologists of that period, Newman, Newport and Walker, are responsible for descriptions of 15 species known from the far north. It speaks well for the skill and judgment of these men that not one of the 15 is now considered a synonym of a species familiar to them *, though Say's name *dorsata* has taken precedence over *Pteronarcys regalis* Newman. Of the 15 species, 14 have now been recognized in later collections, leaving only *Isoperla citronella* to be rediscovered.

The general geographical distribution of northern stoneflies is summarized briefly below, using Halliday's (1937) map of the vegetation regions of Canada as a guide. Further collecting will however doubtless extend the known distribution of many of the species.

I. Species known only from or close to the treeless tundra: *Capnia hantzschi, C. nearctica, Dictyopterygella postica,* and *Isoperla decolorata.*

II. Species known only from the boreal forest: *Taeniopteryx glacialis, Nemoura "E"* and *Isoperla citronella. T. glacialis* has a closely related species or race in the eastern states (*T. alex* Hanson), and a somewhat similar form is common on the Canadian prairies.

III. Species occurring north into the tundra, but found also southward into or through the Great Lakes–St. Lawrence forest region in the east, and (except for the two *Nemourae*) known also in the cordillera of British Columbia or of the United States: *Pteronarcys dorsata, Taeniopteryx maura, T. pacifica, Nemoura rotunda, N. trispinosa, Isogenoides frontalis, Arcynopteryx americana, Isoperla transmarina* and *Hastaperla brevis.*

IV. Species occurring from the boreal forest south through the Great Lakes forest: *Nemoura venosa, Leuctra decepta, Allocapnia minima, Hydroperla subvarians* (?), *H. olivacea, Diploperla decisa, Isoperla bilineata, I. marlynia, Togoperla immarginata, T. media, Acroneuria abnormis,* and *A. lycorias.* Some of these species go a considerable distance south in the Appalachian Mountains. *N. venosa, A. abnormis* and *I. bilineata* are common also in the northern part of the deciduous forest region of the middle-western United States, while the last two are known from the more northern part of the Great Plains grassland.

V. Species not known from the Great Lakes forest, but found from the northern great plains into the boreal forest eastward and northward: *Capnia vernalis.*

VI. Species of the western cordillera, whose ranges extend into the adjacent boreal forest: *Diploperla fraseri, Isoperla fontium* and *Alloperla elevata* (if correctly identified). *Claassenia arctica* is another such species, provided it really does occur in the far north. *Capnia columbiana* is found, in not greatly differing forms, among the mountains of the cordillera and among the more modest peaks of Labrador.

*This is an opportune place to correct a mistsake in my paper on European types (1938a), where the species *Perla sonans* is erroneously ascribed to "Newport, 1851, p. 447." This was inserted following Hagen (1861:17), who lists *"Perla sonans* Barnston, Newport" as a synonym of *Perla* (*Acroneuria*) *abnormis* Newman. Actually the only reference to *Perla sonans* in Newport's 1851 paper is on page 449, where, in describing *Perla abnormis,* he mentions that in some manuscript notes Mr. Barnston has "designated the perfect insect the Drummer (*Perla sonans* Barnston's MSS)". He proceeds to quote Barnston's account of its habits. It would seem therefore that the name *sonans* has never been *published* in conjunction with a description, although Barnstson had evidently written one, and a specimen bearing his manuscript label *"Perla sonans"* is in the British Museum. In these circumstances *sonans* is a *nomen nudum,* which need not be cited further in synonymies. Barnston's specimen, erroneously designated as a type by me, is really *Acroneuria lycorias,* rather than *A. abnormis* as suggested by Newport and Hagen.

In some other insect orders, the far northern fauna includes a considerable proportion of holarctic species. Such have not yet been recognized among stoneflies, but there are two likely candidates, *Arcynopteryx americana* and *Dictyopterygella postica*. The former closely resembles *A. compacta* MacLachlan and some other European forms currently treated as separate species. Similarly *Dictyopterygella postica* resembles *D. bicaudata* Linné. Both *A. compacta* and *D. bicaudata* are found only in the northern or mountainous parts of Europe. Whether the European and American forms can be regarded as conspecific must await a comparison of specimens from both hemispheres. Perusal of accounts of the faunas of the British Isles, Norway, Sweden, Finland, other parts of Europe, China, and Japan has not revealed any other species so closely allied to American ones.

In what follows, records based on specimens in the U. S. National Museum are cited as "USNM". A few from the Royal Ontario Museum of Zoology at Toronto are indicated as "ROMZ," and one or two in the writer's collection as "WER". All other specimens reported here for the first time are understood to be from the Canadian National Collection.

1. *Pteronarcys dorsata* (Say)

Alberta – Grand Rapids and down the Athabaska River: May 24-25, 1914, ♀; F. Harper.

Saskatchewan – Reindeer Lake region, Wapus River: Aug. 25, 1942, 4 nymphs; D. S. Rawson (WER).

Manitoba – Fort Churchill: ♂, ♀ (*P. shelfordi*, Frison, 1934). Fort Churchill: July-August, 3 ♂, 3 ♀; F. Johansen.

Ontario – St. Martin's Falls, Albany River; ♂ (*P. regalis*, Newport, 1851) – this record is accompanied by description and figures which make it unexceptionable. Hearst: May, 1939, 3 ♂, 1 ♀; W. T. Bradley (ROMZ). Kapuskasing, Smoky Falls, Mattagami River: July 5-12, 1934, ♂; G. S. Walley.

Quebec – Abitibi region: July 12-25, 1915, ♀; Dr. Cook. Ungava Bay: exuviae (Smith, 1917). Ungava Bay: ♂, 3 ♀; L. M. Turner (U.S.N.M).

Labrador – Hopedale: Aug. 4, 1924, ♂; W. W. Perrett. Hamilton Inlet, Northwest River: July 22, 1933, 2 ♂; W. W. Perrett.

This is probably the only northern *Pteronarcys*. Walker (1852) lists *P. proteus* Newman from the Mackenzie River watershed, and *P. biloba* Newman from Barnston's site at St. Martin's Falls on the Albany River; and these regions are included in the range of the two species by Needham and Claassen (1925). Until these specimens are restudied, or others are available, neither species can be confidently included in a northern list.

2. *Taeniopteryx* (*T.*) sp., cf. *maura* Pictet

Labrador – Hopedale: June 12, 1924, ♀.

The subgenital plate of this female (figure 1) is more deeply notched than in Indiana or Tennessee specimens (*cf. T. nivalis* Frison, 1935, p. 328), but considerable variation can be expected. At the same time, an element of uncertainty will remain in the determination until a male is available. Existing records of this species range north to Maine and Nova Scotia.

3. *Taeniopteryx* (*Oemopteryx*) *glacialis* (Newport).

Ontario – Albany River, St. Martin's Falls: ♂, ♀ (type locality, Newport, 1849, 1851).

4. *Taeniopteryx* (*Taenionema*) *pacifica* Banks

Labrador – Hopedale: June 12, 1924, ♂, ♀.

T. pacifica is an abundant species of the western mountains, and belongs in a predominantly western subgenus. However, Frison (1942) recently published a series of records for eastern United States, from New Hampshire to Tennessee. Some of these specimens I have seen, and the Labrador male is more like them than like British Columbia specimens, particularly in the sclerotization of the

prong at the base of the cercus, but the differences between eastern and western specimens are very slight. It remains to be seen whether the gap between the eastern and western range of the species will be filled.

5. *Nemoura rotunda* Claassen

Saskatchewan—Black Lake, "Assinaboia": July 6, 1914, ♀; F. Harper.
Manitoba—Churchill: June, 1937, ♀; W. J. Brown.

The distinctive subgenital plate, banded wings, and absence of gills seem sufficient for a definite determination of these specimens.

6. *Nemoura trispinosa* Claassen

Mackenzie — Bernard Harbour: June 30, 1916, ♀; July 16, ♂, ♀; Canadian Arctic Expedition, Fritz Johansen. Recorded as *Nemoura* sp. by Banks, 1918.

Manitoba — Churchill: June, 1937, 6 ♂, 11 ♀; W. J. Brown.

The cerci of the male of this species show considerable variation in detail, particularly in the shape of the posterolateral process. The simplest form is a single slender acute process, observed by the writer in ROMZ specimens collected by Dr. F. P. Ide at East Templeton, Quebec, on the Ottawa River (figure 9). The typical form, as described by Needham and Claassen (1925), and illustrated by them (p. 365) has two divergent cusps at the tip; these figures probably represent the holotype, from Tompkins Co., New York. Recently Frison (1942: 261) has illustrated specimens from northern Illinois, which have three major cusps, and apparently one or more minor ones. Finally, the arctic specimens above have this process much shortened and broadened, so that it is more of a shelf than a process, and it bears three or four short major cusps, some of them rather blunt, and numerous minor ones. These features are illustrated in figures 5, 6 and 8. The female of this species has the cercus somewhat sclerotized and slightly expanded at the tip (figure 10), being thus faintly reminiscent of the male.

7. *Nemoura venosa* Banks

Mackenzie — Cameron Bay [Radium City, Great Bear lake]: Aug. 15, 1937. 2 ♂, 3 ♀; T. N. Freeman.

These specimens are assigned to another *Nemoura* well known in eastern temperate America. As compared with specimens from southern Ontario and Indiana, they are small (♂ 5.5 mm., ♀ 7 mm., to wing tips; cf. 8 and 10 mm. in specimens from Spencer, Ind.). The male genitalia also show differences; the supra-anal process is shorter and broader, while the subanal lobes are much less developed, being scarcely recurved forward, and having the armature of spines greatly reduced. The female has much shallower median and lateral notches in the subgenital plate than have Indiana females. However, similar if less drastic differences are evident in comparing specimens from southern localities, so no taxonomic recognition of these points seems necessary.

8. *Nemoura*, species "E"

Mackenzie — Fort Norman, Mackenzie River: June 29, 1922, ♀; C. H. Crickmay.

This unfamiliar female is probably of an undescribed species. The wings are strongly patterned (figure 3). The subgenital plate is shown in figure 2. It is a large species (length to wing tips 13 mm.), and lacks gill remnants.

9. *Leuctra decepta* Claassen

Ontario — Moosonee: July 18, 1934, 4 ♀; July 20, 6 ♂, 8 ♀; G. S. Walley.

10. *Capnia columbiana* Claassen.

Labrador — Nain: July, 2 ♂; Waugh.

This species has heretofore been recorded only from the Fraser and Skeena Rivers of British Columbia. The supra-anal process shows considerable differences from the typical form, as follows: (1) the upper part of the supra-anal process of western *columbiana* is widest between the prongs of the tip, in Labrador

specimens it is widest at a point behind the tip; (2) the sides of the notch in the front margin of the same are sinuate in western specimens, straight in those of Labrador; (3) the tip of the sclerotized part of the lower half of the supra-anal process is rather sharply notched in the west, rounded in Labrador, though the membranous tip is rounded in both places. These differences are illustrated in figures 4, 7, 11 and 12.

11. *Capnia hantzschi* Ricker

Baffin Land — Nettilling Lake, ♂, ♀ (type locality, Ricker, 1938a).

Mackenzie — Mouth of Coppermine River: June 16, 1926, 4 ♂; W. B. Hoare.

12. *Capnia nearctica* Banks

Mackenzie — Bernard Harbour (type locality, Banks, 1918). Bernard Harbour: June 25, 2 ♀; Can. Arctic Exped., F. Johansen.

The male holotype in the CNC has lost its abdomen, but Professor Nathan Banks has courteously sent me a new drawing of the supra-anal process of the only surviving complete male of the type series, in the Museum of Comparative Zoology. This shows a terminal curved spine, very similar to that in *hantzschi*, but shorter. There are other apparent differences, however, and the couplet separating them in my key to males of *Capnia* (1943, p. 95), can be modified as follows:

7a. Tubercle of the 7th tergite scarcely overlapping the 8th; the two halves of the dorsal part of the supra-anal process thick, expanded (in dorsal view) near their broadly rounded tips; terminal spine of the lower half of the process broad at the base (side view), tapering gradually to an acute tip, and lacking any subterminal process ..... *nearctica* Banks

7b. Tubercle of the 7th tergite projected over about half of the 8th; the two halves of the dorsal part of the supra-anal process less thick, in dorsal view widest near the base and tapering to narrowly-rounded tips; terminal spine of about the same thickness (side view) for most of its length, and with a short blunt subterminal ventral process ..... *hantzschi* Ricker

Both of the female specimens of *nearctica* studied by Banks are at the Museum of Comparative Zoology (Needham and Claassen, 1925). The Bernard Harbour females cited above, though evidently not a part of the type series, are from the same place and time. The subgenital plate agrees well enough with Needham and Claassen's figure (1925, p. 389), but a new illustration may be useful (figure 13). In the other Bernard Harbour specimen the plate is slightly notched at the tip, somewhat as in *C. hantzschi*. The last-named may be indistinguishable in the female. A female collected by J. Carroll, lat. 64° 32' N., long. 107°50' W., 1938, belongs to one or the other of these species. It has very short wings, scarcely exceeding their own thoracic segment, whereas other females of both species have wings extending half the length of the abdomen.

13. *Capnia vernalis* (Newport)

Manitoba — York Factory, ♂, ♀ (Ricker, 1938a).

Ontario — Albany River, St. Martin's Falls: ♂, ♀ (type locality, Newport, 1849, 1851).

14. *Allocapnia minima* (Newport)

Ontario — Albany River, St. Martin's Falls: ♂, ♀ (type locality, Newport, 1849, 1851). Kapuskasing, Smoky Falls, Mattagami River: March 25, 1933, ♀; R. V. Whelan (ROMZ).

15. *Dictyopterygella postica* (Walker)

1852. *Perla (Isogenus) postica* Walker, Cat. Neur. Ins. Br. Mus., p. 144.

1940. *Dictyopterygella hudsonica* Hanson, Proc. Ent. Soc. Wash. *42*:148. New synonymy.

Yukon—Fortymile (Fort Cudahy): August 25, 1896, 2 ♂, 2 ♀; W. Ogilvie.

Mackenzie—Mackenzie River: ♀ (type locality, Walker, 1852). Aklavik: June-July, 1927, ♂; R. T. and A. E. Porsild. West Branch, Mackenzie Delta: July 15, 1924, ♂; W. H. B. Hoare. Fort Enterprise region: 1938, ♀; J. Carroll. Lac de Gras, east end, lat. 64° 36' N., long 109° 59' W.:

1938, ♀; J. Carroll. Sifton Lake, Thelon Game Sanctuary: June 26, 1937, ♀. Keewatin—Baker Lake, lat. 64° N., long. 95° W.: ♂ (type of *D. hudsonica*, Hanson, 1940). Kazan, lat. 63° 1' N.: Aug. 19, 1930, ♀; A. E. Porsild.

The type of this species is evidently a female, because all known males are brachypterous. It has not been correctly recognized since Walker's time, because of the absence of the abdomen. Needham and Claassen (1925) applied the name *postica* to certain eastern specimens, but after a study of the type Dr. Claassen came to the conclusion that this was a mistake (Ricker, 1938a), and Dr. Frison has recently (1942) placed such specimens in *Hydroperla subvarians* (Banks).

The specimens in the CNC are sufficient to show that *D. postica* is common on the Mackenzie River, the type locality, and has a wide distribution in the Arctic. Five females are in the collection, all of which agree with the type in structure and colour. There are two related species, of similar size and body colour, known to occur in the north, *Isogenoides frontalis* and *Hydroperla olivacea*. Both of these have long submental gills, so the failure to find remains of such gills on the types gives some, though not conclusive, evidence that it is not one of these species (Ricker, 1938a). More conclusive is the fact that the rather darkly tinted wings of the *postica* holotype are found also in the CNC specimens, and mark them off sharply from a series of northern *Isogenoides*, which have clear wings. Finally, *H. olivacea* is ruled out both by its clear wings and by the fact that it has one or two costal crossveins beyond the cord (in the writer's experience), whereas in the type of *postica* there are four; the range in the latter species is two to five, in the CNC material.

The association of male and female is made fairly definite by the two pairs taken at Fortymile on the Yukon. The male agrees completely with Hanson's description and figures of *Dictyopterygella hudsonica*, and this makes it unnecessary to give another description of that sex.

The female may be described as follows: Length to tip of wings 12.5 mm. Colour and general structure as in the male. Venation as in figure 14. The subgenital plate, in the Yukon specimens, is produced over about half of the 9th sternite; it is broad, truncate behind, its sides broadly rounded and deeply excavated (figure 15). The more easterly specimens, from Kazan and Sifton Lake, have the hind margin considerably excavated instead of truncate, while the excavation at the side is only slightly indicated.

As suggested earlier, both male and female specimens of this species conform well to existing descriptions and figures of *Dictyopterygella bicaudata* Linné (*D. recta* Kempny). In *postica* a slight flair outward of the tips of the subanal lobes is noticeable in some views, though in others they appear as straight as Hanson has shown them. Female *bicaudata*, as illustrated by Kempny (1900, p. 90) under the name *Isogenus nubecula* (?), resembles the eastern specimens of *postica*; but in Europe, as in America, there is apparently considerable variation in the shape of the subgenital plate.

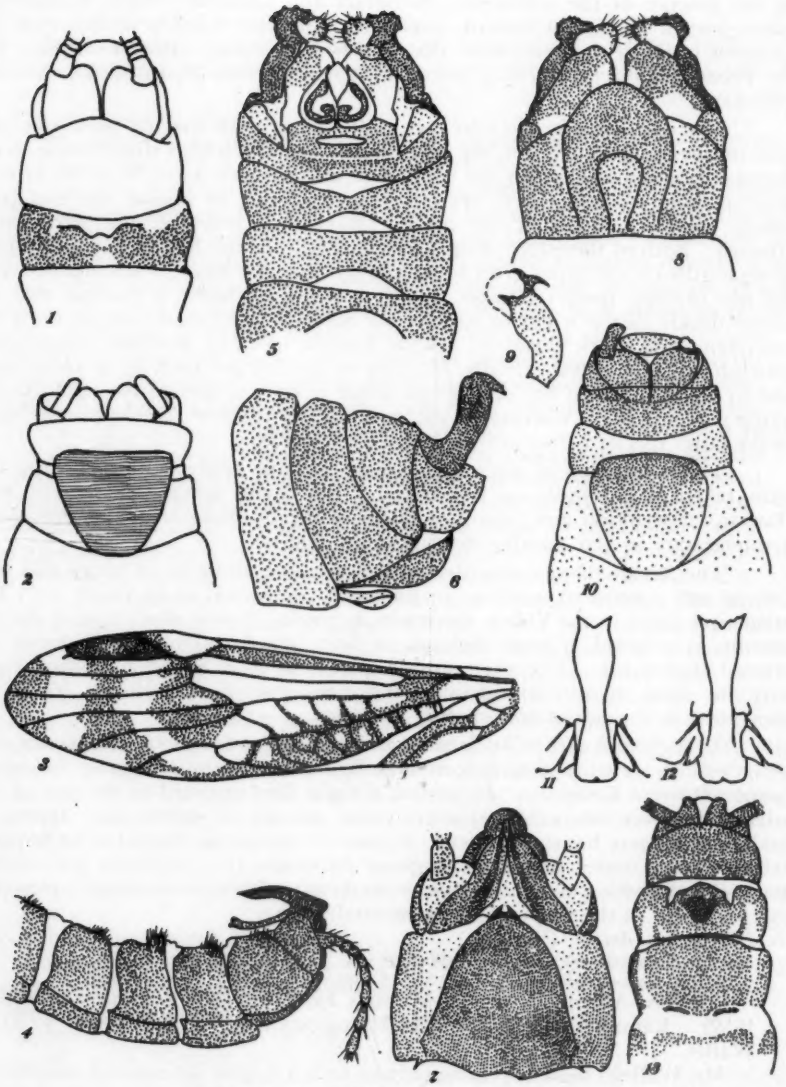
16. *Diploperla decisa* (Walker)

1852. *Perla* (*Chloroperla*) *decisa* Walker, Cat. Neur. Ins. Br. Mus., p. 170.
1920. *Perla verticalis* Banks, Bull. Mus. Comp. Zool. *64*:318. New Synonymy.

Ontario—Albany River, St. Martin's Falls: ♂ (type locality, Walker, 1852). Kapuskasing, Smoky Falls, Mattagami River: July 1, 1934, ♀; G. S. Walley.

Mr. Walley's female specimen agrees with a female determined as *verticalis* Banks by Dr. Frison, and in non-sexual characters with the holotype of *decisa* Walker. The male *verticalis* cannot be distinguished from the holotype of *decisa* in described sexual characters, except for some minor differences in the shape of the basal part of the supra-anal apparatus (Ricker, 1938). Since *verticalis* males have now been taken well into Ontario, there is very little like-

PLATE IX



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lihood of specific differences between the eastern and the northern form. The female subgenital plate is shown in figure 21.

17. *Diploperla fraseri* Ricker

Mackenzie—Fort Wrigley, Mackenzie River: July 25, 1922, ♀; C. H. Crickmay.

18. *Isogenoides frontalis* (Newman)

1838. *Perla* (*Isogenus*) *frontalis* Newman, Ent. Mag. 5:178.

1943. *Isogenoides hudsonicus* Hanson, Amer. Midland Nat. 29:662. New Synonymy.

Alaska—Near Fort Yukon: ♂; Dr. T. E. Winekoff (USNM). Fort Yukon (*I. hudsonicus*, Hanson, ♀).

Yukon—Dawson: Sept. 5, 1912, ♀; J. M. Jessup (USNM; determined and recorded by Needham and Claassen, 1925, as *Isogenus frontalis*, and by Hanson, 1943, as paratype of *Isogenoides hudsonicus*). Dawson: July 2, 1919, ♀; H. G. Dyar (USNM).

Mackenzie—Aklavik: June-July, 1927, ♂; R. T. and A. E. Porsild. Fort Norman, Mackenzie River: Aug. 9, 1922, ♀; C. H. Crickmay. Fort Wrigley, Mackenzie River: July 5-15, 1922, ♂; C. H. Crickmay. Upper Mackenzie River (*Isogenus colubrinus*, Needham and Claassen, 1925). South Nahanni River: August, 1928, 2 ♂.

Alberta—Athabaska River, near Calling River: May 21, 1914, ♂; F. Harper. Athabaska River, Grand Rapids to Crooked Rapids: May 24-28. 1914, 2 ♂; F. Harper. Athabaska River near L. Athabaska: June 8, 1943, ♀; D. S. Rawson (WER). Great Slave Lake: (Needham and Claassen, 1925; Hanson, 1943, as *I. hudsonicus*).

Manitoba—Churchill: ♂, ♀ (Frison, 1942).

Ontario—"Hudson's Bay"—probably at St. Martin's Falls on the Albany River: ♀ (Ricker, 1938a).

Quebec—Ungava Bay: ♂, 2 ♀ (CNC) and ♂, 3♀ (USNM); all L. M. Turner. (These specimens, and more in the Cornell University collection, were determined as *Isogenus colubrinus* by Needham and Claassen, 1925, and include the type series of *Isogenoides hudsonicus* Hanson).

Labrador—Cabot Lake: ♀; Waugh. Hamilton River, Muskrat Falls: July 12-19, 1919, ♂; S. E. Arthur.

The type of Hanson's *Isogenoides hudsonicus* is one of a good series which is mostly at Cornell University, but several specimens of which were sent to the CNC and the USNM by Dr. Claassen. The CNC males agree with Hanson's description in having the genital hooks more slender, and less angulate on the outer margin, than is usual in other localities. The same is true of the Hamilton River male. However, all the CNC northern males taken west of Hudson Bay have the hooks short and usually sharply angulate, whereas Hanson carries the range of *hudsonicus* across the northern part of the country to Great Slave Lake, Dawson and Fort Yukon. Actually, the *typical* form of the hook in the Mackenzie Basin can be distinguished not only from the Ungava type, but also from the typical form in the central cordilleran region, or from that in settled parts of eastern America. But there are variations within all these regions, and it would be difficult to place a lone specimen, if it lacked locality label. The other characters said by Hanson to distinguish *hudsonicus* are even more variable than the genital hooks, so it would seem that it is merely one of the considerable number of the minor geographical variants to be expected in a widespread and abundant species.

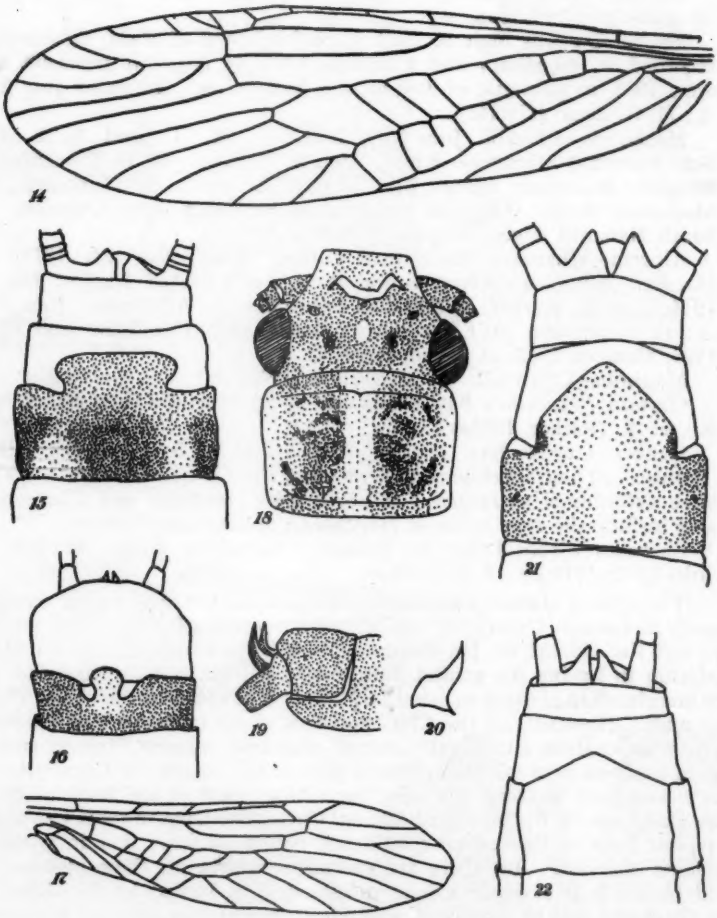
19. *Hydroperla* sp., cf. *subvarians* (Banks)

Ontario—Kapuskasing River, Smoky Falls: July 20, 1935, ♀; R. V. Whelan.

20. *Hydroperla olivacea* (Walker)

Ontario—Albany River, St. Martin's Falls: ♂ (type locality, Walker, 1852); ♀ (Ricker, 1938a). "Hudsons bai": ♂ (Ricker, 1938a).

PLATE X



PLECOPTERA FROM THE FAR NORTH

21. *Arcynopteryx* (*A.*) *americana* Klapálek

1912. *Arcynopteryx americana* Klapálek, Cat. Coll. Selys-Longchamps, Fasc. IV, 21.
1912. *Arcynopteryx minor* Klapálek, Ibid., p. 22. New Synonymy.
1942. *Perlodes minor* Frison, Bull. Ill. Nat. Hist. Surv. *22*, p. 287. (Synonymy of *slossonae* Banks, *lineata* Smith and *margarita* Alexander with *minor*).
1942. *Arcynopteryx minor* Hanson, Amer. Midland Nat. *28*:396. (Synonymy of *ignota* Smith and *inornata* Smith with *minor*, plus the 3 mentioned by Frison).

Alaska—Mt. McKinley Nat. Pk., 1932, ♀; F. W. Morand (USNM). Mt. McKinley Nat. Pk.; 4000 feet, snowbank: July 5, 1938, 2 ♂, 2 ♀; G. P. Englehardt (USNM).

Baffin Land—Tikerakdjuak, Nettilling Lake: July 12-22, 1910, 7 ♂, 5 ♀ (*Perlodes minor*, Ricker, 1938b). Nettilling Lake: July 19, 1925, ♀; J. D. Soper.

Mackenzie—Lat. 64° 25' N., long. 109° 54' W.: 1938, ♂; J. Carroll. Great Slave Lake: June 28, 1924, ♀; J. Russell.

Keewatin—Kazan, 63° 1' N.: July 19, 1930, 2 ♀; A. E. Porsild.

Alberta—Lake Athabasca, Burntwood Island: June 18, 1943, ♂, ♀, 2 exuviae, immature nymph; D. S. Rawson (WER).

Saskatchewan—Tazin River (Assinoboia): July 11, 1914, ♂, ♀; Harper. "Arctic America"—(Type locality of *Arcynopteryx minor* Klapálek, 1912).

The specimens above are by no means uniform in appearance, but I find no non-intergrading characters to separate them. Mr. Soper's Baffin Land specimen, as well as the Berlin series from the same place, are unusually large. The Slave Lake female is peculiar in having the wings shortened to about half length; other females are long-winged. There is nothing to distinguish this species from *descriptions* of the European *A. compacta* (MacLachlan), known from Scotland, Scandinavia, the southern Baltic coast and, in closely related if not identical forms, the Alps and Pyrenees. A discussion of the generic position of the type of *A. americana* has been given elsewhere (1943, p. 114).

22. *Isoperla bilineata* (Say)

Ontario—Kapuskasing, Smoky Falls, Mattagami River: July 6, 1934, ♂; G. S. Walley.

Quebec—Abitibi Region: June 20-26, 1915, 2 ♂; Dr. Cook.

23. *Isoperla citronella* (Newport)

Ontario—Albany River, St. Martin's Falls: ♂, ♀ (type locality, Newport, 1849, 1851).

24. *Isoperla decolorata* (Walker)

Alaska—Mt. McKinley Park: July 16, 1931, ♂; 1932, ♀; F. W. Morand (USNM). Rampart House: Aug. 25-29, 1912, ♂; J. M. Jessup (USNM).

Mackenzie—Great Bear Lake: ♀ (type locality, Walker, 1852). Fort Wrigley, Mackenzie River: July 25, 1922, ♂, ♀; C. H. Crickmay.

Keewatin—Kazan, 63° 1' N. latitude. August 19, 1930, ♀; A. E. Porsild.

Manitoba—Fort Churchill: August, 1929, ♂; F. Johansen. June, 1937, ♂; W. J. Brown.

Ontario—Little Current River [tributary of the Kenogami and hence of the Albany River]: July 11, 1903, ♀; W. J. Wilson (USNM).

This species has not been correctly recognized since its description by Walker (1852). The writer (1938a:145) found the ♀ type in poor condition, but was able to figure the subgenital plate. A new description is presented, including the heretofore unknown male, based primarily on the Fort Wrigley pair, of which the ♂ is here designated **neallotype**.

Length of (dry) body: ♂ 6.5, ♀ 7 mm.; to tip of wings: ♂ 10.5 mm., ♀ 11.5 mm. General color brown with yellow markings. Head and pronotum as in figure 18. The ocellar spot is scarcely recognizable, and the other markings are much less distinct, in the Kazan female. Wings with a clear membrane and light brownish-yellow veins (figure 17). The slanting terminal costal

crossvein may be on either side of the cord; in the Kazan female there are two such crossveins beyond Sc.

Male: The lobe on the 8th sternite is very sharply demarkated, and much constricted at the base (figure 16). The subanal lobes are heavily sclerotized, and rather broad, but constricted to sharp recurved tips (figures 19, 20).

Female: The subgenital plate of the 8th sternite is produced over about half of the 9th, in a broad-based triangle with nearly straight sides and a subacute tip (figure 22). In the holotype this tip has a small but definite notch. However, similar variation from a notched to a notchless form is known in other stoneflies, for example *Isoperla bilineata* (Frison, 1935, p. 330).

25. *Isoperla fontium* Neave

Alaska—Mt. McKinley National Park: 1932, ♀; F. W. Morand (USNM).

26. *Isoperla marlynia* Needham and Claassen

Manitoba—Churchill: ♂ (Frison, 1942).

Quebec—Eastmain River, James Bay: Aug. 1-14, 1934, ♂; R. C. McDonald.

27. *Isoperla transmarina* (Newman)

Manitoba—Churchill: ♂, ♀ (Frison, 1942).

Ontario—Kapuskasing, Smoky Falls, Mattagami River: July 1, 1934, ♀; July 10, 2 ♂; G. S. Walley.

Quebec—Abitibi region: June 9-15, 1915, ♂, ♀; June 20-22, 2 ♀; July, 1916, ♀; Dr. Cook. Eastmain River, James Bay: July 18-Aug. 1, 1934, ♀; Aug. 1-14, ♀; R. C. McDonald.

28. *Togoperla immarginata* (Say)

Quebec—Eastmain River, James Bay: Aug. 1-14, 1934, ♂; R. C. McDonald.

29. *Togoperla media* (Walker)

Saskatchewan—Reindeer Lake region, Wapus River: Aug. 25, 1942, 3 nymphs, 2 exuviae; D. S. Rawson (WER).

Ontario—St. Martin's Falls, Albany River: ♂ (type locality, Walker, 1852). Moosonee: July 18, 1934, ♀; G. S. Walley.

Quebec—Eastman River, James Bay: Aug. 1-14, 1934, 6 ♀; R. C. McDonald.

30. *Acroneuria abnormis* (Newman)

Ontario—Cochrane: Aug. 16, 1925, ♂; M. J. Rowland. Kapuskasing, Smoky Falls, Mattagami River: July 18, 1934, ♂; Aug. 4, ♀; R. V. Whelan (ROMZ).

Quebec—Eastmain River, James Bay: Aug. 1-14, 1934, ♂, ♀; R. C. McDonald.

31. *Acroneuria lycorias* (Newman)

Ontario—Albany River, St. Martin's Falls: ♀ (*Acroneuria "sonans"*, Ricker 1938a).

Quebec—Abitibi region: July 25-31, 1915, ♀; Aug. 16-21, 1915, ♀; July 1916, ♀; Dr. Cook.

32. *Claassenia arctica* (Klapálek)

"Arctic America": ♂, ♀ (type locality, Klapálek, 1916).

This species has more recently been found abundantly in the mountains of western Canada and the United States. We cannot be wholly confident that the types are really from the region treated in this paper.

33. *Alloperla* sp., cf. *elevata* Frison.

Mackenzie—Fort Norman, Mackenzie River: Aug. 25, 1922, ♀; C. H. Crickmay.

This lone representative of *Alloperla* in the north presents a remarkable contrast with the abundance of species and individuals farther south.

34. *Hastaperla brevis* (Banks)

Manitoba—Churchill: ♂, ♀ (Frison, 1942). July, 1937, 14 ♂, 9 ♀; W. J. Brown.

Ontario—Kapuskasing, Smoky Falls, Mattagami River; June 16-July 7, 1934, 2 ♀; G. S. Walley.

Quebec—Eastmain River, James Bay: Aug. 1-14, 1934, 2 ♀; R. C. McDonald.

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EXPLANATION OF PLATES IX AND X

Taeniopteryx, cf. *maura* Pictet. Hopedale, Labrador: **1**. Posterior sternites of ♀.

Nemoura, species "E". Fort Norman, Mackenzie: **2**. Posterior sternites of ♀. **3**. Left forewing of ♀.

Nemoura trispinosa Claassen. Bernard Harbour, Mackenzie: **5**. Terminal tergites of ♂. **6**. Tip of abdomen of ♂, from the left side. **8**. Terminal sternites of ♂. **10**. Terminal sternites of ♀. East Templeton, Quebec: **9**. Left cercus of ♂, from above.

Capnia columbiana Claassen. Nain, Labrador: **4**. Terminal abdominal segments of ♂, from the left side. **7**. Terminal sternites of ♂. **11**. Supra-anal process of ♂, from above. Fraser River at Agassiz, British Columbia: **12**. Supra-anal process of ♂, from above.

Capnia nearctica Banks. Bernard Harbour, Mackenzie. **13**. Terminal sternites of ♀.

Dictyopterygella postica (Walker). Fortymile, Yukon: **14**. Left forewing of ♀. **15**. Terminal sternites of ♀.

Diploperla decisa (Walker). Smoky Falls of the Mattagami River, Ontario: **21**. Terminal sternites of ♀.

Isoperla decolorata (Walker). Fort Wrigley, Mackenzie: **16**. Terminal sternites of ♂. **18**. Head and pronotum of ♀. Churchill, Manitoba: **17**. Right forewing of ♂. **19**. Terminal sternites of ♂, from the right side. **20**. Left subanal hook of ♂, from behind. Kazan, Keewatin: **22**. Terminal sternites of ♀.

A NEW PSYCHID FROM QUEBEC (LEPIDOPTERA, PSYCHIDAE) *

By T. N. FREEMAN,
Ottawa, Ont.

Hyaloscotes sheppardi n. sp.

Male. Head, thorax and abdomen black, covered with long silvery-grey, hair-like vestiture; antennae greyish-brown, strongly bipectinate and composed of eighteen joints; fore tibia without epiphysis; wings uniformly smoky, without markings and sparsely covered with short pile; fore wing with area adjacent to outer side of the upper part of the discal cell sunken, causing this to appear as an elongate, obscure discal spot; costal and outer margins of all wings darker; fringes light grey. Expanse: 19 mm.

Wing venation. (fig. 3, holotype). Fore wing with R_3 and R_5 stalked, the stalk remote at base from M_1; 1stA from the angle of 2ndA and extending to wing base; 3rdA free for a short distance at the base. Other specimens show variation of venation on opposing wings. In one, the bases of M_1 and R_3-R_5 are connate on one side and shortly stalked on the other. In the holotype, M_2 and M_3 of hind wing are narrowly separated at their bases on the right side (fig. 3) and shortly stalked on the left. The 1stA of the fore wing may be represented only by a short, curved spur from the angle of 2ndA.

Eighth ventral plate. (paratype, fig. 2). Anterior margins extended into two divergent arms, the apices of which are pointed or rounded. The posterior margin poorly defined and merges into the intersegmental membrane.

Male genitalia. (paratype, fig. 1). Apex of sacculus with minute teeth which can only be seen with high magnification. Dorsal bulbous base of clasper with very minute teeth.

Female. Grub-like, with shining dark brown head and thorax, the head with two, deep, fronto-clypeal pits. Appendages apparently lacking. Abdomen sac-like.

Case. Clavate, one inch in length and covered longitudinally with short pieces of grass blades.

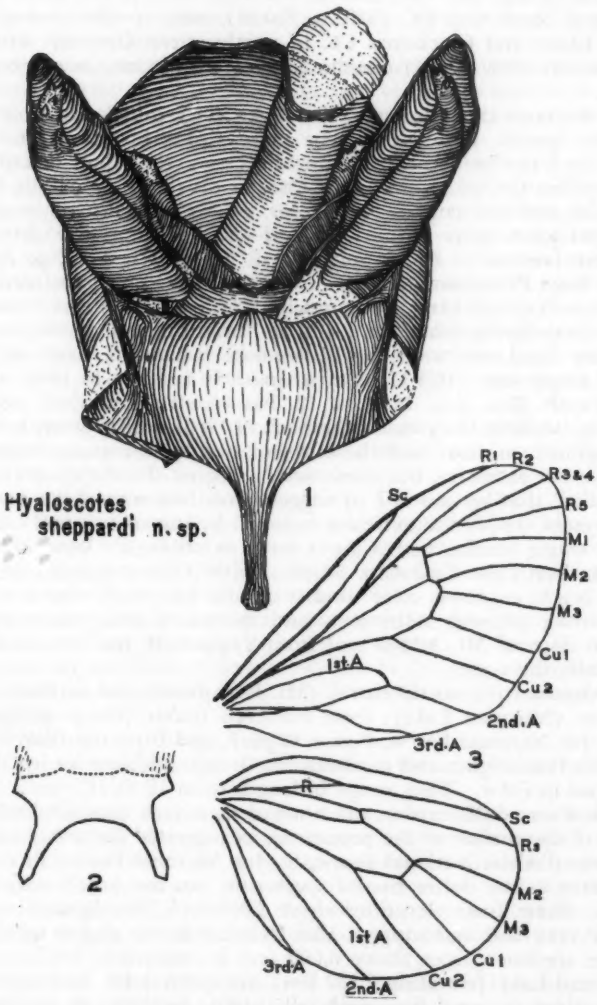
Holotype—♂, Shawbridge, Que., June 19, 1939 (A. C. Sheppard); No. 5547 in the Canadian National Collection, Ottawa, Ont.

Paratypes—3 ♂, same locality and collector as holotype, June 22-30, 1935; 1 ♂, same data, June 24, 1934. Single paratypes have been deposited in the collections of Mr. Frank Morton Jones, Wilmington, Delaware, and Mr. A. C. Sheppard, Montreal, Que., in whose honor the species is named. I wish to acknowledge with appreciation Mr. Jones' valuable suggestions which have been freely used in the preparation of this description.

Sheppardi is closely allied to *pithopoera* Dyar but in this latter species, the apex of the sacculus is not spined as correctly stated and figured by Dyar (1923, Ins. Insc. Menst. 11:3, Pl. 1, figs. 1-3) and kindly confirmed by Mr. Carl Heinrich, U. S. N. M., Washington, D. C. The anterior arms of the eighth ventral plate of *pithopoera* are parallel and not divergent from their bases as in *sheppardi*. According to Mr. Jones, the type series of *fumosa* Butl. (five moths, Mt. Shasta, Calif.) all show M_1 connate with the base of R_3-R_5, with the exception that one wing only of one of the specimen shows M_1 forked with the stem of R_3-R_5; the antenna is composed of at least twenty-four joints, and the fore tibia possesses an epiphysis. On the basis of these characters, I do not consider *fumosa* to be congeneric with *sheppardi*. Two specimens before me from Banff, Alta., are closely allied to *sheppardi* superficially, but are larger, possess the parallel, anterior arms of the eighth ventral plate as in *pithopoera*, and the spines of the sacculus as in *sheppardi*. Until more material is available, their identity remains uncertain.

* Contribution No. 2313, Division of Entomology, Science Service, Department of Agriculture, Ottawa.

PLATE XI



A NEW PSYCHID FROM QUEBEC

1, male genitalia. **2**. eighth ventral plate of male. **3**, wing venation.

NOTES ON *ZACOTUS MATTHEWSII* LeC.

Zacotus matthewsii LeC. (*matthewsi auct.*) is a rare beetle that lives in damp situations under cover in timbered areas in the Pacific Northwest. LeConte, Ann. Mag. Nat. Hist. (4) IV, 1869, p. 373-374, described it from a unique female from Vancouver Island. Horn, Trans. Ent. Soc. IX, 1881, p. 169, listed it from Washington; Leng, Cat. Col. Am. n. of Mex. 1920, p. 68, listed it from "No. Cal."; Casey, Mem. Col. IX, 1920, p. 290-291, cited specimens from Moscow in northern Idaho and Clackamas Co. in northwestern Oregon; and Van Dyke, Pan-P. Ent. II, 1925, p. 95, from the Bitter Root Mountains of extreme western Montana.

At the same time, however, Van Dyke (l.c.) called attention to the variation in the species, noting that "the more alpine forms are also less robust, narrower, and less brilliant." Meanwhile Casey (l.c.) had described *angustus* from Josephine Co. in southwestern Oregon on the basis of "its more slender form, violet and not cupreous-red color, longer cephalic impressions, shorter third palpal joint, more abruptly incised and less impressed elytral striae and many other features". R. Hopping, Can. Ent. LVII, 1925, p. 206, described *subopacus* from Princeton, Merritt, and Kaslo, in the southern interior of British Columbia, as "entirely black, opaque with a faint purple lustre," and the coastal *matthewsii* was distinguished from it by its "bright metallic color, strongly rugose front of the head, and transversely rugulose pronotum, more definite elytral striae and larger size:" 16.5-17 mm. in length in contrast to 13-15 mm. Nunenmacher, Pan-P. Ent. XX, 1944, p. 12, has recently described *fredericki* from Lincoln Co., western Oregon, on the basis of "its metallic green color."

Specimens are rare and the series of twenty-nine examples in the Hatch collection is not extensive, but shows such a degree of individual and geographical variability that we are led to suggest that Nunenmacher's and Hopping's forms represent simply the extremes assumed by the coastal and inland populations of a single species, with Casey's form in between. West of the Cascades (Friday Harbor, Lake Cushman, Seattle, Forest Grove, Salem) the tendency is towards a bright cupreous color that is usually but not always accompanied by variably strong greenish reflections, and specimens from above 6,000 feet on the eastern slope of Mt. Adams and from Toppenish, just east of the Cascades, are essentially the same.

Specimens from north-central (Mt. Bonaparte) and extreme northeastern Washington (Newman Lake), from northern Idaho (Coeur d'Alene National Forest, St. Joe National Forest, Pierce, Waha), and from the Blue Mountains of southeastern Washington and northeastern Oregon are more or less dull purplish or violaceous in color. They range in length from 12 to 16.5 mm. (the smallest specimen is a very dull female) and none of them lack completely the transverse rugulosity of the surface of the pronotum, as suggested for *subopacus*. Some of them (Coeur d'Alene National Forest, St. Joe National Forest, Pierce) are nearly as brilliant as the duller coastal specimens, but are nearly without greenish reflections. Some, from elevations above 3,000 feet (Mt. Bonaparte, Blue Mts., Waha) are very dull and support Van Dyke's note on alpine specimens, but a Mt. Adams specimen from above 6,000 feet is reasonably brilliant and others from Newman Lake (elevation 2,130 feet) are quite dull. Moreover, Hopping's *subopacus* is not reported from especially alpine localities in British Columbia. Certain specimens in the series are as a whole somewhat slenderer than others, but this seems to be correlated neither with sex, with distribution, nor with altitude. The degree of impression of the elytral striae likewise varies indiscriminately.

Melville H. Hatch,
Seattle, Wash.
Kenneth M. Fender,
McMinnville, Ore.

RECENT WORK BY THE INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

The International Commission on Zoological Nomenclature are now engaged in the publication of decisions taken before the outbreak of war in 1939. These decisions have been embodied in *Opinions* 134-183 and *Declarations* 10-12. Of these, *Opinions* 134-155 and the 3 *Declarations* have already been published or are in the press. The remainder are ready for printing and will be published as soon as funds are available.

These *Opinions* are of particular interest to entomologists, since in addition to 9 *Opinions* relating to the interpretation of various aspects of the International Code, no less than 38 of these Opinions are directly concerned with entomological subjects.

The *Opinions* relating to the interpretation of the Code are: *Opinion* 138 (meaning of phrase "definite bibliographic reference" in Article 25); *Opinion* 141 (naming of families); *Opinion* 145 (status of names first published in invalid works); *Opinion* 147 (generic names of same origin and meaning as older generic names); *Opinion* 148 (status relating to names published as emendations of, or substitutes for, older names); *Opinion* 164 (position as regards types when two or more genera are united); *Opinion* 168 (supplementing *Opinion* 65 regarding genera based upon erroneously determined species); *Opinion* 172 (status of type-designations of genera in abstracts, etc); and *Opinion* 183 (interpretation of Article 8 relating to form in which generic names should be published).

Of the *Opinions* specially concerned with entomological subjects, 6 deal with the status of particular works or with the dates of such works: Opinion 136 (Latreille, 1810) affects all Orders of insects; *Opinion* 135 ("Erlangen List", 1801) is of special interest to hymenopterists; *Opinions* 134 (Freyer, *Neue Beiträge*), 138 (Hübner, *Samml. exot. Schmett* 1807 and Fabricius *Mag. Insektenk.* (Illiger), 1807) and 150 (Hübner, *Verz. bek. Schmett*) are concerned with Lepidoptera and *Opinion* 152 (Meigen, 1800) with Diptera. *Opinions* 140 and 143 deal with certain family names in insects.

The remaining 30 *Opinions* deal with particular generic names in various Orders of insects. These *Opinions* either fix the types of these genera or add the names to the *Official List of Generic Names in Zoology*, or do both. Three of these *Opinions* are concerned with Orthoptera; 13 with Hymenoptera and 14 with Lepidoptera.

Each *Opinion* is published separately but *Opinions* are consecutively paged to facilitate the publication of an index on the completion of the volume concerned.

The International Commission are most anxious to secure that *Opinions* are published as rapidly as possible but they are greatly hampered by lack of funds. The Commission therefore appeal to scientific institutions and individual scientific workers for donations to a special fund to be used for the issue of publications. Full particulars of this Appeal are given in Part 2 of the Commission's Official Organ, the *Bullentin of Zoological Nomenclature* published in 1943.

Contributions, however small, will be warmly welcomed and will be acknowledged in the *Bulletin*. Bankers' drafts, cheques, and Money Orders should be made payable to the 'International Commission on Zoological Nomenclature' and sent to the Commission at their Publications Office, 41 Queen's Gate, London, S.W.7. All orders for the Commission's publications should be sent to the same address. Inquiries relating to the work of the Commission should be addressed to me at 83 Fellows Road (Garden Flat), London, N.W.3.

Francis Hemming, Secretary,
International Commission on Zoological
Nomenclature,

TWO NEW RACES OF THECLINAE FROM SOUTHERN BRITISH COLUMBIA (LEPIDOPTERA) *

BY J. McDUNNOUGH,

Ottawa, Ont.

Callipsyche behrii columbia var. nov.

Differs from typical *behrii* (as represented by specimens from Mammoth Camp, Mono Co., Calif., and by Holland's figure) in the considerably larger size, the much darker color of the underside and the heavy nature of the black spotting. On both primaries and secondaries the postdiscal row of spots is much more pronounced and on secondaries the submarginal row is very heavy and the spots show a distinct tendency to inward, triangular elongation. The orange lunule in interspace Cu_1 is small and at times obsolescent which at once distinguishes the race from the eastern Coloradan var. *crossi* Field in which the underside is also darker than in the typical form. The males show little trace of whitish subterminal shading on the secondaries but in the females such shading is much more evident. Expanse, 25-27 mm.

Holotype — ♂, Fairview, B. C., June 12, 1919 (W. B. Anderson); No. 5474 in the Canadian National Collection, Ottawa.

Allotype — ♀, same data.

Paratypes — 1 ♂, same data; 1 ♂, 1 ♀, Osoyoos, B. C., June 10, 1919 (W. B. Anderson); 1 ♀, Osoyoos, B. C.; 1 ♂, Vasseau Lake, B. C., June 14, 1920 (W. B. Anderson); 1 ♀, Okanagan Falls, B. C., July 23, 1895.

The race is confined to the extreme south-central section of British Columbia and is apparently rather rare; it will probably be found in adjacent regions of Washington State.

In this connection it might be well to mention that the name *kali* Strecker, now sunk as a synomym of *behrii* and based on an Arizona male, may have to be resurrected for a race from the Southwest (S. W. Colorado, Arizona and adjacent areas) in which the color of the underside is paler — especially in the females — than the type form; the spotting is heavier and the orange lunule well-developed. There are several specimens before me merely labelled "Colo. Bruce" which may have come from Glenwood Springs and are certainly not var. *crossi*. They seem, however, to fit in fairly well with Strecker's description of *kali* and until the type can be examined I am holding them temporarily under this name.

Strymon saepium okanagana var. nov.

Larger in size than var. *chlorophora* Wat. & Com. from California, but with the same dark ground-color on underside of wings and the same tendency for the basal area of hindwings to deepen in color as compared with the marginal area. The postmedian dark line of spots on the underside of both wings is prominent and is bordered outwardly — in contradistinction to *chlorophora* — more or less prominently with white, although not as heavily (especially on primaries) as in typical *saepium*, as figured so well by Oberthur (1913, Et. Lep. Comp. IX (1), 40, Pl. 235, fig. 1922) and as commented on by Watson & Comstock (1920, Bull. Am. Mus. N. Hist., XLII, 453). The two round black spots at anal angle and in cubital interspace of hindwings are large and prominent, considerably more so than in *saepium* and var. *chlorophora*, and the patch of blue scaling between these two spots is also large and more extended than in the other forms.

Holotype — ♂, Peachland, B. C., July 5, 1907 (J. B. Wallis); No. 5502 in the Canadian National Collection, Ottawa.

Allotype — ♀, Same data, July 6.

*Contribution No. 2287, Division of Entomology, Science Service, Department of Agriculture, Ottawa.

Paratypes – 2 ♂, same data, July 4, 5; 2 ♂, Lillooet, B. C., July 21, 1916; 1 ♀, Seton Lake, B. C., July 3, 1926 (J. McDunnough); 1 ♀, Mainland, B. C., June 15, 1901 (E. Anderson) (this specimen in Los Angeles Museum Collection).

This fairly well defined race, as races go in the Theclas, is apparently rare and most likely confined to the so-called "dry-belt" area of British Columbia; it represents the northernmost extension of the species; a couple of worn specimens from the Nelson region of the Kootenays (a wetter area) appear to be closer to *chlorophora*.

A series from Donner Lake, Nevada Co., Calif., seems to be an intermediate between *okanagana* and our *chlorophora* from Lake Tahoe and Southern California; some specimens match quite well – except in smaller size – with the underside maculation of *okanagana*; others show the smaller black anal spots of *chlorophora* but possess stronger white borders to the postmedian lines.

Several specimens in our collection labelled simply "Colorado, Bruce" are also very similar to *okanagana*, the size and markings being much the same but the ground-color of the underside paler. More material from these localities and from intermediate points will be needed before any further splitting into races is undertaken.

ADDITIONS AND CORRECTIONS TO THE CHECK LIST OF THE MACROLEPIDOPTERA OF ALBERTA

BY K. BOWMAN,

Edmonton, Alta.

In the following list of additions and corrections to my "Annotated Check List of the Macrolepidoptera of Alberta", published in 1919 by the Alberta Natural History Society, the numbers and names are in accordance with the McDunnough list of 1938, the numbers of the Barnes and McDunnough list of 1917 being given in brackets. Since 1921, seven brief lists of additions and corrections have appeared in the *Canadian Entomologist* (53: 13-14, 211-212, 55:71-72, 56:189-191, 60:117-118, 66:131-132, 70:260-261).

The following names should be deleted from the list.

(9) *Papilio machaon aliaska* Scudd., this proves to be *P. machaon hudsonianus* Clark.
(2485) *Acronicta chionochroa* Hamps.; was based on *A. cretatoides* Benj.
(3671) *Cerura cinerea cinereoides* Pack.; was based on *C. cinerea wileyi* Dyar.
(4018) *Hydriomena californiata* Pack.; recorded in error.

The following are additions to the Check List.

9 (9) *Papilio machaon dodi* McD. July. Dorothy, Nordegg.
9 (9) *Papilio machaon hudsonianus* Clark. June, July. Nordegg, Chipewyan.
41 (59) *Colias eurytheme amphidusa* Bdv. August. Edmonton.
41 (59) *Colias eurytheme alberta* Bowman. June, July. Wembley, Fort Vermilion.
41 (59) *Colias eurytheme pallidissima* Bowman. June, July. Wemblev, Fort Vermilion.
127 (122) *Oeneis chryxus caryi* Dyar. June. Fort Vermilion.
166 (158) *Argynnis cybele pseudocarpenteri* Chermock. July. Banff.

191 (171) *Argynnis nevadensis semivirida* McD. August. Hillcrest.
452 (429) *Plebeius aquilo megalo* McD. June, July. Nordegg, Jasper, Hillcrest.
484 (468) *Epargyrius tityrus* Fabr. June. Medicine Hat, Lloydminster.
742 (708) *Paonias myops mccrearyi* Clark. June. Lloydminster.
1062 (1024) *Nemeophila plantaginis scudderi* Pack. July. Lloydminster.
1148 (2491) *Acronicta americana* Harr. May. Medicine Hat, Lloydminster.
1154 (2486) *Acronicta leporina cretatoides* Benj. May. Edmonton, Calgary, Red Deer.
1247 (1250) *Euxoa olivalis* Grt. June, July. Lethbridge, Nordegg.
1249 (1251) *Euxoa oblongistigma* Sm. July, August. Lethbridge.
1255 --- *Euxoa aberrans* McD. July. Lethbridge.
1347 --- *Euxoa simona* McD. June, July. Calgary.
1349 --- *Euxoa petruska* McD. June. Calgary.
N.S. --- *Euxoa altera* McD. July to September. Calgary.
1387 (1372) *Chorizagrotis auxiliaris montanus* Cook. July. Lethbridge, Nordegg.
1421 (1231) *Agrotis patula* Wlk. July. Nordegg.
1718 (1748) *Lacinipolia longiclava* Sm. May. Medicine Hat.
2095 (2038) *Oncocnemis occata* Grt. May. Medicine Hat.
3254 (3236) *Autographa rectangula nargenta* Ottol. July. Nordegg.
3344 (3053) *Catocala relicta clara* Beut. August, September. Edmonton, Calgary, Banff, Red Deer, Lethbridge.
3373 (3082) *Catocala concumbens* Wlk. August. Lloydminster.
3484 (3184) *Zale minerea norda* Sm. May. Medicine Hat.
3489 (3187) *Zale benesignata largera* Sm. May. Edmonton.
3935 (3671) *Cerura cinerea wileyi* Dyar. May to July. Medicine Hat, Lethbridge.
3999 (3754) *Epicnaptera americana ferruginea* Pack. April. Edmonton, Calgary.
4226 (3956) *Lobophora nivigerata* Wlk. May. Lloydminster.
4420 (3998) *Dysstroma hersiliata manitoba* McD. July. Calgary, Nordegg.
4543 (4063) *Entephria lagganata* Tayl. August. Nordegg, Lake Louise.
4614 (4309) *Deilinia erythemaria* Gn. May. Lloydminster.
4730 (4374) *Semiothisa decorata arubrescens* McD. May. Medicine Hat.
4737 (4379) *Semiothisa mediaria* Pack. May. Medicine Hat.
4804 (4289) *Eufidonia discospilata* Wlk. June. Lloydminster.
4960 (4624) *Paleacrita vernata* Pack. April. Medicine Hat.
5000 (4705) *Euchlaena vinulentaria ochreana* McD. May, June. Waterton, Lethbridge, Banff.
5059 (4664) *Ennemos subsignarius* Hbn. May Medicine Hat.

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